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## Powering Colorado: Cabin Creek Hydroelectric Generating Facility

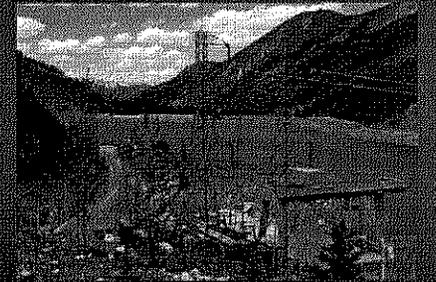
Legislative Water Resources Review Committee  
October 10, 2013

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Xcel Energy

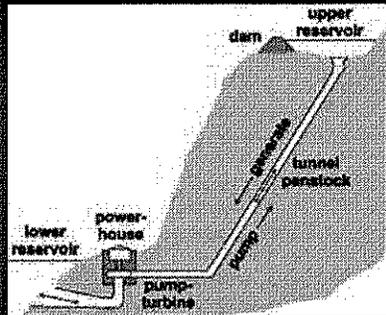
## Cabin Creek Hydroelectric Generating Station

- ▶ Hydroelectric pumped storage power plant
- ▶ Located near Georgetown, at 10,018 feet above sea level
- ▶ Two units, each with a nameplate capacity of 150 MW
- ▶ Fuel Source – water supplied from two reservoirs totaling 1,977 acre feet



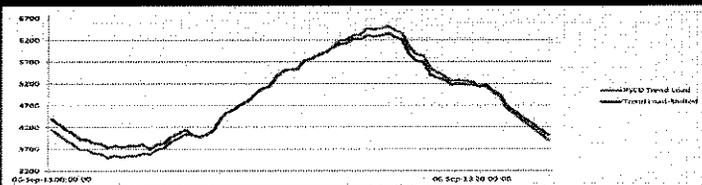
## Cabin Creek responds to demand quicker than any other facility on our system

- ▶ Plant can start up and be fully loaded within 10 minutes; turn-around time is 15 minutes
- ▶ Pumped storage plant with a lower and upper reservoir, use during peak demand
- ▶ Electricity generated by releasing water from upper reservoir through a tunnel, which turns the turbine generators
- ▶ Water is then stored in lower reservoir
- ▶ Overnight when electricity demand is low, water is pumped back to upper reservoir



## Cabin Creek Hydroelectric Generating Station – Black Start

- ▶ Cabin Creek has the ability to start up with only the use of station batteries
- ▶ Personnel are trained to conduct a black start
- ▶ Test procedure once a year
- ▶ Water volume maintained in the Upper Reservoir at all times for black start
- ▶ We can start Georgetown Hydro without external power and feed Cabin Creek if necessary
- ▶ Cabin Creek can then be used to start larger plants



### Role Cabin Creek Plays in Xcel's Distribution System

- ▶ Cabin Creek is also used as a "load-shifting" device
  - Generate when load is high; Pump when load is low
  - "Flattens" load curve by displacing peak load with off-peak load
  - Allows for greater wind penetration to load overnight
  - Can be "load-shifting" while carrying reserves
  - Traditionally will generate during super peak hours and pump during off peak hours
  - Effective cost of the hydro generation is reduced by using wind energy to replenish the upper pond overnight

### FERC Cabin Creek License

- ▶ Issued in 1964; 50 year license; expires February 28, 2014
- ▶ License Application submitted February 27, 2012; includes,
  - Description of Project operations
  - Identify and Analyze the effects of ongoing Project Operations
  - Propose protection, mitigation, and enhancement measures during the new license term
  - Proposed Operational Upgrade

## Cabin Creek Proposed Operational Upgrade

- ▶ Upgrade to the pump-generating equipment
  - From 300 MW (nameplate) to 336 MW
  - Increase turbine efficiency from 86% to 91%
- ▶ Expand Useable Storage Capacity in the Upper Reservoir
  - Increase storage by approximately 75 ac-ft
  - Storage increase completely contained within existing reservoir
  - Only minor changes to the parapet wall to pass design flood needed

## New License Issuance - Status

- ▶ Expect FERC's Environmental Analysis of the Project, including the proposed upgrade, any day
- ▶ Expect that the License will be issued prior to expiration of current License
- ▶ Xcel Energy will conduct a final assessment and financial feasibility of the upgrade once the License is issued

Questions?